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THREE NEW SPECIES OF *BELOCEPHALUS* FROM FLORIDA.

BY WM. T. DAVIS,

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While at Punta Gorda in Southern Florida in November, 1911, with Mr. Charles W. Leng and Dr. Lutz, of the American Museum of Natural History, the writer was much interested in the songs of two species of *Belocephalus* that frequented the same clumps of palmetto. One of them was a large insect averaging 40 mm. in length and a bold singer. He would perch himself on the topmost leaf of a scrub palmetto and stridulate a song hardly to be distinguished from the rapid *ik-ik-ik* of the *Conocephalus ensiger* that inhabits north-eastern United States. The other was a smaller species averaging 31 mm. in length; was more retiring in habits, and sang a slow *zeek-zeek-zeek*. In addition to the size a difference in color was immediately noticed, namely the antennæ of the larger species was always immaculate, while the smaller species had the first ten or fifteen joints spotted with black. These maculations in the brown individuals often became rings entirely encircling the first antennal joints, whereas in the large species, whether brown or green, the antennæ were unicolorous. These two insects fed on the species of palmetto, their powerful jaws enabling them to gnaw the tough leaves.

On our way north to Jacksonville we stayed over a day at Newberry in the western part of Florida, and found under the loose bark of an old pine stump a *Belocephalus* that differed from the smaller species mentioned above mainly in the form of the fastigium, and in size. Mr. Leng found four others just like it between some boards piled by the side of the railroad.

In the Proceedings of the Boston Society of Natural History, Vol. XVII, 1875, Scudder described *Belocephalus subapterus* from two females, "one from N. E. Florida, the other from Florida." These types have been examined, but so far good characters have not been found for the separation of the females of all of the species of *Belocephalus*. This must await further collecting. A recent visit to Philadelphia and the examination of the material collected by Rehn &

Hebard in northeastern Florida, in Georgia and in South Carolina, proves that *Belocephalus* males coming from that section, and consequently to be considered as *B. subapterus* Scudder, are different from any of the three species mentioned above.

The three new species may be described as follows:

***Belocephalus sabalis*, new species.**

Type, green male from Punta Gorda, Desoto Co., Fla., Nov., 1911. Mandibles and lower edge of front black, the upper surface of the head and pronotum unicolorous, showing no stripes. Fastigium very sharp pointed, slightly bent downward and tipped with black. Inferior basal tooth of fastigium also tipped with black. Antennæ about as long as the body and unicolorous. Tegmina about two thirds as long as pronotum. Abdomen with a scarcely perceptible, interrupted carina. Legs unicolorous, except the tips of the spines which are black. The subgenital plate has two stout appendages with rounded extremities. They are about twice as long as broad. The outer extremities of the plate are not bent upward and inward and produced into points.

Length of body 41 mm.; of fastigium beyond base of antennæ 4 mm.; of pronotum 10 mm.; of tegmina 7 mm.; of hind femora 20 mm.

In addition to the type, twelve green males and one brown male, all from Punta Gorda, Fla., have been examined. The brown specimen differs in having a mid-dorsal stripe of a darker color. The stripe commences on the fastigium, widens posteriorly and extends to the base of the pronotum.

***Belocephalus hebardi*, new species.**

Types, brown male and green female, Punta Gorda, Desoto Co., Fla., Nov., 1911. Mandibles, lower edge of front and base of antennæ beneath black. The upper surface of the head and pronotum with a faint line on either side of a yellowish color, which is bordered interiorly with blackish. These stripes extend from the fastigium backward to the base of the thorax. Fastigium very sharp pointed, slightly bent downward and tipped with black. Inferior basal tooth of fastigium also tipped with black. Antennæ longer than the body and the first few joints blotched, or nearly encircled with black, the color fading out and the last joints unicolorous. Abdomen with a scarcely perceptible, interrupted, carina. Legs with a row of about eight fuscous spots on outer side of each fore femur, and the tarsi of all of the legs blotched, but irregularly, with fuscous. The female has some additional spots on the middle and hind femora. The subgenital plate of the male has two tapering appendages that are about three times as long as broad. The outer extremities of the plate are bent upward and inward, and produced into points.

	♂ Mm.	♀ Mm.
Length of body	34	35
Length of fastigium beyond base of antennæ.....	2	3
Length of pronotum	9	9
Length of tegmen	8	3
Length of caudal femur	17	19
Length of ovipositor		21

In addition to the types five green males, six brown males and two brown females have been examined from Punta Gorda.

***Belocephalus rehni*, new species.**

Types, green male and brown female, Newberry, Alachua Co., Fla., Nov., 1911. Mandibles, lower edge of front and base of antennæ beneath, black. The upper surface of the head and pronotum with a faint line on either side of a yellowish color, which is bordered interiorly with blackish. These stripes extend from the fastigium backward to the base of the thorax. Fastigium short, blunt pointed and tipped with black. Inferior basal tooth of fastigium also tipped with black. Antennæ longer than the body and the first joints annulated with black, the color fading out toward the tip. Abdomen with a scarcely perceptible, interrupted carina. The femora and tibiæ of all of the legs are blotched with brown, and the abdomen is finely flecked with the same color. The subgenital plate of the male has two tapering appendages that are about four times as long as broad. The outer extremities of the plate are not bent upward and inward into points.

	♂ Mm.	♀ Mm.
Length of body	24	29
Length of fastigium beyond base of antennæ....	1.5	2
Length of pronotum	7	7
Length of tegmen	7	2
Length of caudal femur	13	17
Length of ovipositor		21

In addition to the types, three brown individuals, two males and a female, have been examined, all from Newberry, Fla.

The species of *Belocephalus* may be separated as follows:

Vertex of the head produced as a stout sub-cylindrical thorn tapering apically.

Body of ♂ about 40 mm. in length; antennæ unicolorous. The outer extremities of the subgenital plate not bent upward and inward, and not produced into points *sabalis* sp. nov.

Body of ♂ about 35 mm. in length; pronotum striped; antennæ spotted. The outer extremities of the subgenital plate as in *sabalis*.

subapterus Scud.

- Body of ♂ about 31 mm. in length; antennae spotted. The outer extremities of the subgenital plate bent upward and inward and produced into sharp points *herbardi* sp. nov.
- Vertex of the head rounded, no thorn.
- Body of ♂ about 25 mm. in length; antennae spotted..... *rehni* sp. nov.

THE NUMBER OF MOULTS OF THE PEAR-SLUG, CALIROA CERASI LINNÉ.

BY R. L. WEBSTER,

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In the course of some experiments with the pear-slug, *Caliroa cerasi* Linné, in the insectary of the Iowa Agricultural Experiment Station at Ames, considerable interesting data on the moults was obtained. A brief account of this work in general has already been given by the writer (1911). It seems well, however, to give the whole in detail here, as a study of the moults and head widths of this particular insect. The notes were made during the summers of 1909 and 1910; in 1909 by the writer, in 1910 by Mr. T. M. McCall and the writer.

A short account of the life history of this insect follows.

The larva is a dark, almost black, slimy slug, about $\frac{2}{5}$ of an inch long when full grown, which feeds on cherry, pear and plum leaves. These slugs feed on the upper side of the leaves, eating out all the tissue except the veins and the lower surface. The injured leaves become dry and brown and fall from the trees, which are sometimes left entirely bare of foliage in midsummer. The slugs appear twice during the year in central Iowa, the first brood coming on about the middle of June, the second about the third week in July. The insect winters in the larval stage in the ground.

Harris (1841) said that the larvæ moulted five times, Dyar (1895) said that there were six stages (five moults to maturity), and also gave some measurements of the head widths. Marlatt (1897) in his account of the insect said that there were five moults. So there has been no difference of opinion regarding this essential point. However, the measurements which follow will show that considerable